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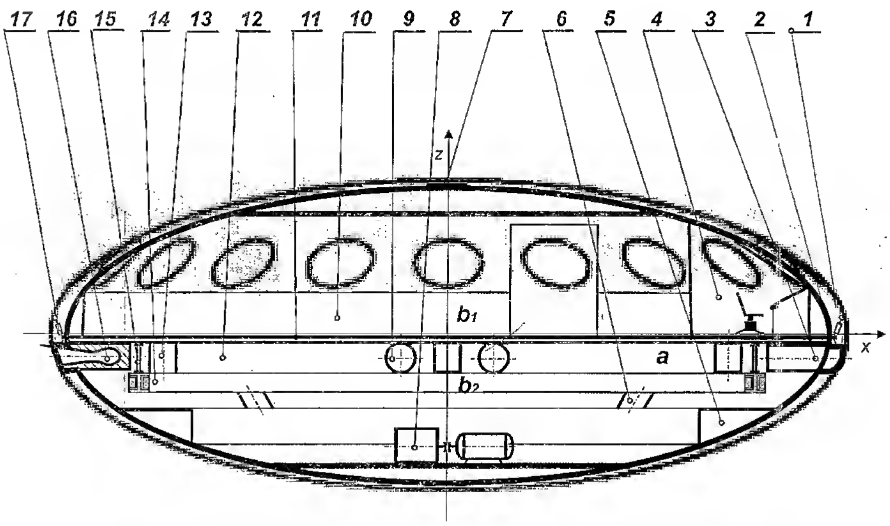

(57) Abstract: The disc flying object is a new form of aircraft for flying through atmosphere or space. The armour (1) and the body (2) have a form of the disc, i.e. the form of ellipse observed from directions of x and y-axis and the form of circle observed from direction of z-axis. The body (2) is divided by the floor (11) to the upper part (10) and the lower part (12). The upper part is intended for command area (4), for passengers or scientific devices. In the lower part there is a special stabilizer (14), group of engines (13) for vertical flight and hovering, engine group (16) for flying forwards, engine group (3) for flying backwards, engine group (9 and 29) for lateral moving of the object, then undercarriage (6), fuel tank (5), auxiliary equipment (8) and useful load. The stabilizer (14) and the engine groups (turbojet, rocket or plasma reactive) provide the disc flying object with remarkable stability in space and maneuver abilities, because it can fly in all directions at high velocity transporting heavy load to great distances.

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DISC FLYING OBJECT

TECHNICAL FIELD IN REGARD TO THE INVENTION

The invention belongs to the atmospheric and space aircrafts engineering field, i.e. the new, natural forms of aircrafts in the form of a disc with great stabilization in state of moving or steadiness in space, vertically ascending or lowering on Earth or some other heavenly body; with great maneuver abilities and radical changes in flying directions depending on space it moves through, with turbojet or rocket (classical or plasma reactive) engine drives or their combination, with small movement resistance, wide range of flying speed (under sound or over sound to 5 M, I and II cosmic speed and up to 0,6 c for plasma reactive engine),with ability to transport heavy loads and fuels.

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TECHNICAL PROBLEM

In what way to solve the problem of an aircraft having a natural disc form for flying through atmosphere or space, with small flying resistance coefficient during flying through atmosphere, with great surfaces and ascent coefficient, with ability for vertical ascent and descent and hovering in space, also having great maneuver ability in the course of moving and hovering with wide range of flying velocity depending on application of the aircraft; with a possibility to promptly change directions and courses of moving, to be able to function using the existing turbojet and rocket engines, and subsequently plasma reactive engines for accomplishing maximum speed in atmosphere and speeds required for closed or opened trajectories around the planet, with easy modifications of velocity and flying directions, for transport of heavy loads and fuel for departure and return to specific spots in space?

This invention with its natural form, great stability and aircraft drive in which, apart from new advantages, the ones of plane, rockets and partly of helicopters are united, solves all above mentioned and other problems concerning atmospheric or cosmic space as the disc flying object.

BACKGROUND ART

Man's striving to be able to fly is probably as old as mankind itself, the myth about Icarus and Dedalus points to it. Works of great minds – Leonardo da Vinchi drawings and patents of Nikola Tesla show us how great that striving is. The first actual flying has been achieved with balloons in 18th century and flying airships in 19th century. At the end of 19th and the beginning of 20th century first flying by plane were accomplished and in the fifties rockets were developed flying men into space. However, very dynamic development of aircrafts-airplanes, gliders, helicopters, hovercrafts and rockets with or lacking men crew has actually been achieved in 20th century, especially in its second half.

Airplanes are highly developed nowadays, starting from the small, sport airplanes, agricultural and those used for fire extinguishing, to the huge passenger and cargo planes. Plane speed depending upon the type and application, is from few hundred km per hour to 3,5 M (Mach). The drive is achieved with airscrews set to motion by piston or turbojet engines or by turbojet engines only. Their characteristic is that the ascent and stabilization is accomplished with wings containing the drive fuel, and in the fuselage is the useful load. The control and stabilization elements (ailerons, cover wings, flaps, vertical stabilization, trimmers) are thus exposed to outer influence, which can cause difficulties in the course of flying, especially in high altitudes. The supple wings ($\lambda > 6$) are subject to oscillations and easy fractures. With drive engine ceasing to work it abruptly dives. Long runways – from few hundred meters to ten kilometers are necessary for taking – off and landing. Plane maneuver abilities are limited and vertical taking – off or landing are impossible (with the exception of several VTOL types). Relatively small wing surfaces limit the useful load size that is why the load size takes only one fifth of the total aircraft weight.

Rockets are also highly developed nowadays, so that they are used for delivering artificial satellites around Earth, or to send cosmic devices to interplanetary space and some even to interstellar space with powerful multiple digress rockets. Rockets are characterized by the fact that they are used only once – after the power of rocket ceases to work it is discarded. Subsequently, the controls and service modules continue their independent flight and only the control module returns to Earth. Because of the impossibility to adjust the velocity and trajectory, the destination in space must be " aimed at ", i.e. the launching must be performed exactly in a specific moment otherwise the rocket would miss its destination.

Space aircraft-shuttle or Buran is not capable to take-off by itself. It is ejected into orbit using once-usable, powerful buster rockets. Returning, the shuttle does not have the possibility of adjusting the velocity and the movement corrections are limited and that is why it dives towards Earth. That causes great thermic strains of covering which is also the case with control module returning to Earth, when all telecommunication contacts are interrupted.

The first flying object similar to the disc is an aircraft on air cushion, better known as hovercraft. It is the aircraft that vertically rises from surface (of approximately 0,5 m) and then horizontally flies using small speed over flat surfaces (ground or water) or it hovers. First suggestion for such an aircraft was given by a great mind, Nikola Tesla. With it he has probably predicted, as well as for a great number of other achievements, that the final form of flying objects would be in the shape of a disc or ellipsoid. However, abilities of hovercraft are modest because of the drive and insufficient stabilization.

From above briefly noted state of flying engineering it can be deduced that each aircraft type has relatively small possibilities, i.e. great limitations. None of them has united positive characteristics of the other, i.e. of the numbered main types. As far as I know, some testing with the similar forms has been conducted in Germany before World War II and in America in the second half of 20th century, but all of them proved to be unsuccessful.

DISCLOSURE OF INVENTION ESSENCE

The disc flying object has the form of a disc –it is a circle in horizontal projection and ellipse in vertical projection. The circle radius is the big semi-axis of the ellipse. The ratio circle diameter and disc height (the ratio ellipse semi-axis **a : b**) is ranging from 2 : 1 to 10 : 0 and it depends on application of the flying object. As a rule, this ratio is bigger for greater aircraft velocities, because the movement resistance coefficient is smaller. Apart from this basic form, the flying object can be composed of two discs in moving direction, or of three discs forming equilateral triangle with rounded angles.

The disc flying object is actually composed of armour and body, whereas the body is a smaller disc inside the armour and subdivided in two parts by horizontal plane- upper part for the aircraft staff, space for measuring, regulating and controls equipment, passengers, scientific equipment and so on; and the lower part is for stabilization, drive engines, fuel, useful load, undercarriage and other auxiliary equipment.

The flying disc armour, together with top fuel reservoirs, can swivel in relation to the horizontal axis and also around the vertical axis of the object for a smaller angle using specific number of hydraulic cylinders (at least four pairs of them). The swiveled armour in relation to the body keeping moving direction provides the ascent of the object or it's turning in a great angle, keeping passengers and the load in horizontal position.

The undercarriage, as a rule, consists of four stands (three at least) that are telescopically bound hydraulic cylinders withdrawing inside the body after the take –off.

The drive of the flying object includes four engine groups of different application: for vertical ascend, landing and hovering in space, for flying forwards in projected speed, for sudden brake and flying backwards and for sudden lateral moving and rotation around the vertical axis. The type of engine drives depends on application of the aircraft- turbojet, rocket (classical or plasma reactive), or the combination of the two. It is necessary to point out that this shape, or the ellipsoid, is ideal for plasma reactive engines that are to be expected in recent future.

The group of engines for vertical take-off, landing and hovering of the flying object is placed on the disc flange, or on the flange of the object composed of two or three discs. The number of engines in this group depends on the weight of the object and the speed required for vertical movement. Generally, there are six of them and the half should have the buoyancy enough to maintain the object in flying position.

The group of engines for flying forwards provides the necessary velocity of the object, overcoming the resistance of atmosphere flying through it, or the appropriate velocity in cosmic space. For example, moving through the atmosphere requires at least three turbojet engines of the speed up to 2,5 M and for accomplishing the speed up to 5 M two or more rocket engines are added.

The group of engines for sudden brake and moving backwards are set on the disc flange on the side of the course of moving. They are used for prompt decrease of the velocity and stopping of the object, and subsequently for flying backwards. Generally there are two engines.

The group of engines at the flanges of the flying object, under right angle in relation to the flying course, is used for abrupt lateral moving and prompt turning. There are two engines on each of the flanges. When both of the engines on one side are working, the object abruptly moves to the opposite side. When one engine is turned on at each side, opposite regarding the center, they form a couple for revolving the object around its vertical axis and thus quick turning of the object flying or in the state of hovering.

During the flight, all combinations of engine performance from particular engine groups are possible, providing remarkably great maneuver abilities of this flying object.

The stabilization is one of the most important elements for moving the disc flying object through space at all. Considering that, observed from above (or under) it is a circle, and in front (or from the side) is an ellipse, it does not have any other elements of stabilization. That is why the stabilization of the disc flying object is performed with specially constructed gyroscope. Beneath the floor bound to it is gyroscope stator, in which two rings rotate in opposite directions around the vertical axis of the disc. If you observe this whole it is a ring of rectangular cut, the stator is I profile in the cut in which vertical is the drive of the rings, and the inner and outer rings rotate between the horizontal tracks. Mechanical drive (gears or friction), fluid under pressure or inverse magnetic field can be used as the rings drive. Mechanical drive is for very small and school aircrafts, compressed air is for moving through that space, and possible use of pressured liquid is also used for space aircrafts. Inverse magnetic field accomplished with alternating polyphase currents has universal application and then the rings have the role of short-circuited electric motor's rotors.

The rotation speed of the rings, the inner as well as outer one, i.e. the kinetic moment of gyroscope itself depends on outer forces trying to take the rotation axis from the direction of vertical axis of the disc, i.e. to swivel it. The change of angular rotation speed of the rings is deduced by changing the number of revolutions of drive gear or friction wheel at mechanical drive, by changing the quantity and pressure of the fluid at such drive or by changing frequency of the polyphase electricity's at inverse magnetic field. Balancing of the object in space, causing it not to revolve around its own axis is achieved by opposite- direction ring_rotation. They should have the same value of their own kinetic moment that satisfies the condition of top stabilization.

The rings between the upper and lower stator arms can rest mechanically (on balls or cones), using fluid cushions or strong magnetic field. The choice depends on size and application of the disc flying object.

For successful start, flying and landing of the disc flying object other equipment is required which can be named auxiliary equipment. For the start of the object a source of electrical energy is

necessary and it depends on the application of the aircraft. For smaller ones flying through the atmosphere accumulator battery is sufficient for turning the turbojet engines subsequently producing the required amount of electricity. Great aircrafts require a special set of machines for electricity production and at the same time they are the spares.

For the drawing of the undercarriage in and out, for swiveling of the armour in a small angle in relation to body of the object, for opening and closing of the air hatches of the turbojet engines etc., an appropriate hydraulic set of machines with the installation is required.

For maintaining the pressure in the aircraft, opening and closing of the doors (in the state of resting), cooling of the engine, etc. a compressor with pneumatic installation is required.

Also, for the safe flight of the disc flying object, a specific number of measuring, regulatory, control and telecommunication devices is required, such as altitude meter, speed indicator, the object position indication in relation to all three axis, engine performance parameters, stabilizator work parameters, auxiliary equipment, pressure indicator, also the audio and visual contact devices, radars, etc., depending on the application of the aircraft.

The disc flying object volume is very great and comparing disc diameter and the length or wingspan of airplanes; it surpasses volumes of other modern aircrafts in multiple ways. The basic division of the disc space concerning the horizontal axis surface is on the upper and lower space. In the upper space, above the floor, is a space for the staff of the flying object, controls, and passengers if applied for the transportation of the mentioned, or for laboratory and scientific equipment and for similar applications. The section of the top ellipse obtained by the cut of the surface parallel to the floor which is also the ceiling for the passengers, has a space that can be used for fuel storing (the upper fuel tank), occupying approximately the third up to the half of the total fuel quantity. Larger quantity of the fuel is stored in the lower tank placed just under the stabilizer which is ring-shaped. The space between the floor and the stabilizer is reserved for the drive group of engines. The area inside the stabilizer rings and the lower fuel tank and beneath it is reserved for auxiliary equipment and useful load.

The space division is similar with the flying objects composed from two or three discs. However, according to the needs, this division of disc space can be different, that will be determined by the constructor depending on the application of the disk flying object.

BRIEF DESCRIPTION OF DRAWINGS

Picture 1 – shows **A–A** cut of the disc flying object from picture 2.

Picture 2 – shows view **A** on the disc flying object from picture 1.

Picture 3 – shows view **C** on flying object composed of the two discs from picture 4.

Picture 4 – shows view **D** on flying object composed of the two discs from picture 5.

Picture 5 –shows view **B** on flying object composed of the two discs from picture 4.

Picture 6 - shows view **F** on flying object composed of the three discs from picture 7.

Picture 7 – shows view **E** on flying object composed of the three discs from picture 6.

Picture 8 – diagrammatically shows effect of forces on the disc flying object from picture 1 when the armour is swiveled for α angle in relation to the body in the direction of flying.

Picture 9 – shows cut of the ring stabilizer 13 from picture 1.

Picture 10 – shows the position of the group of engines for vertical flying and hovering of the disc flying object on view **G** from picture 11.

Picture 11 – diagrammatically shows the arrangement of the group of engines with moving directions and courses of the disc flying object on view **H** from picture 10.

DETAILED DISCLOSURE OF THE INVENTION

Two geometric forms dominant in macro world – the circle and ellipse, i.e. bodies: ball and ellipsoid. Based on it, the form of the disc flying object is deduced, as a natural form.

The disc flying object is basically composed of the armour 1 and the body 2. The floor 11 divides the disc body in two parts, the upper 10 for the crew, passengers or minor loads, controls area 4 for commands and regulatory devices, scientific devices etc.,.and the lower part 12 for drive engine groups 3, 9, 13, 16, 28, 29, stabilizer 15, fuel tanks 5, undercarriage 6, auxiliary equipment 8 and useful load. Under the floor 11, and on the disc flange bound to the floor are engine groups 13 for vertical ascend, engine group 16 for flying forwards, engine group 3 for prompt stopping and flying backwards and engine groups 9 and 29 for rapid lateral moving and rotating around z-axis during flying or hovering of the object. The armour and the body of the disc flying object are linked with hydraulic cylinders 17, as well as with slide contacts 7, providing the swiveling of the object in relation to the body for a small angle up to maximum 10°, around x and y axis, i.e. in the floor plane.

Observing the object from the front or from the side, from directions of x and y – axis, a form of the ellipse is perceived as shown in the A-A cut. Observing the above mentioned from above, from directions of z-axis, view A; the circle of radius R is viewed. The big semi-axis of the ellipse **a** is equal to the radius R. The minor semi-axis of the ellipse, $\mathbf{b_1}$ and $\mathbf{b_2}$, are 2 to 10 times smaller than the big semi axis, depending on the object size. The bigger semi-axis **a**, i.e. the radius R, the ratio of semi-axis is greater. With the ratio increase the movement resistance coefficient is smaller, meaning it is maximum for the ratio 2 and maximum for the ratio 10.The maximum movement resistance coefficient would be if semi-axis were equal, i.e. when the ball form would be obtained. The values of movement resistance coefficient are to be measured experimentally in aerodynamic tunnels for all axis ratios.

The form of a disc has small resistance coefficients especially because the inductance is very small. The splitting of airflows during flying of the disc is similar as with the wings, but the paths of the flows on the flanges of the profiles differ. The longest paths are of the flows over the middle of the disc, decreasing to the left and to the right, so that over the flanges of the disc for **a = R** they are minimum.

In the case of the equal minor semi-axis of the upper and lower part of the ellipse, $\mathbf{b_1}$ and $\mathbf{b_2}$, and in case there is no swiveling around y-axis in relation to x-axis, the air flow velocities of the upper and lower side of the profile (the upper and the lower) would be equal and there would be no ascent force ($F_z = 0$). When the ellipse form consisting of two semi-ellipses is procured, the upper one being with semi-axis $\mathbf{b_1}$ and the lower with semi-axis $\mathbf{b_2}$, $\mathbf{b_1}$ being larger than $\mathbf{b_2}$, then the air flow velocity over the upper would be greater than the velocity of the lower. It means that the pressure on the upper will be smaller than on the lower, and the basic ascent force F_z occurs under the framework swiveling angle of 0°. This value of the ascend force will be sufficient for maintaining the flight direction but only over the specific velocity of the given profile. The value of the ascent coefficient $\mathbf{c_z}$ should be measured experimentally.

The movement resistance forces $F_{x\text{ and}}$ of the ascent F_z are relevant for moving of the disc flying object in atmospheric area (of Earth or some other heavenly body). Flying through cosmic area, this profile offers other advantages and the most important is that the hits of micrometeorites pose minimum danger in harming the covering and the advantage of the profile for excellent maneuver abilities for avoiding crashes with greater meteorites as well as remarkable surveying.

The form of the flying object can be accomplished conjoining two discs, or, to be more specific, conjoining two semi-discs linked longitudinally with elliptic cylinder in moving direction 16. This form of the flying object is suitable for minor flying velocities and heavier loads. The combination of three discs is also possible, i.e. of the parts, the thirds of the discs linked with elliptic semi-cylinders, and in the center with flat surfaces on the top and lower side 17. This form of the flying object is appropriate for even smaller flying velocities and even heavier loads.

The profile of the disc flying object involves large inner volume and large ascent surface with relatively small outer surface. In that way the great useful space and ascent with relatively small flying resistance is provided.

Walls of the disc flying object, the armour 1 and the body 2, consists of thin and solid profiles made from light metal alloys, the inner as well as the outer covering. The inner covering is made of light metal sheets or of technical polymers. The outer covering is made of light metal sheets (for smaller flying velocities), and for great flying velocities from titanium or polycarbonates. The outer covering can be lined with material slightly reflecting electromagnetic waves (invisible for radars, and the profile itself has slight reflection), or with soft material for absorption energy of meteorite hits during flying through cosmos, for example with expanding polyurethane adapted for low temperatures and covered with carbonate fibers. Between the inner and outer covering thermo-insulating material can be installed (for smaller flying velocities) or the air could flow for cooling (for greater flying velocities during flying through atmosphere), as well as for heating (for flying into space).

The windows are set at the profile 1 armour flanges and in one or two rows in the same direction on the body 2, and as usual, above the disc floor. Some windows could be set at the lower side

of the profile for surveying from the luggage area. The shape, size, number of rows and number of windows in line, as well as other specifics will be determined by the object constructor.

Position, number and size of the doors on the disc flying object are also to be determined by the object constructor depending on the application. Generally, above the floor are the doors for entrance of the passengers or for specifically light loading. For heavy loads doors could be set from the lower side together with assembling stairs or narrow platform. In the flying object for flying through space between exit door and the inner area, there is a decompression chamber on exit of cosmonauts into outer space (and vice versa on their return).

For increasing the ascent force F_z of the disc flying object in the course of moving through atmosphere and at specific velocity, and also for increasing (for + F_z) or decreasing (for - F_z) of flying altitude, the armature 1 should be swilled around y –axis for a specific angle α in relation to movement direction as it is diagrammatically shown in picture 8. The ascent force is calculated in the usual form from fluids mechanics:

$$F_z = c_z * \rho * A * (v^2 / 2) \quad [N]$$

Where:

$c_z = f(\alpha)$ - is the ascent coefficient as the function of the swivelling angle

ρ [kg / m^3] - is the density of the fluid through which the object is moving

$A = R^2 * \pi$ [m] - is the disc surface stressed with ascent force

v [m / s] - is the object's velocity.

It is noticeable that it is necessary to increase the swivelling angle α and thus the ascent coefficient c_z during flying through fluid of smaller density, i.e. on greater altitudes in the atmospheric space as well as at decrease of flying velocity. The ascent coefficient c_z should experimentally be measured for each profile of the disc flying space, depending on the ratio of semi-axis of the ellipse – a to b_1 and b_2. The maximum value of the swivelling angle α should also be determined when it comes to the revolving around y-axis. That leads to the change of the direction and course in vertical plane, i.e. it comes to the moving in vertical bend of small radius that is required for the objects of special application and not for usual passenger or cargo planes.

During the swiveling of the armour of the object (axis x`) in relation to the course of flying (axis x) in picture 8, center of gravity of weight G of the object does not move, and with it apparently moves backwards for a small unit, which is positive for the disc stability. With increasing the swiveling angle α, center of pressure, i.e. the point of application of the force F, which is the vector addition of the movement resistance force F_x and the ascent force F_z; moves backwards from the course of moving, i.e. it moves towards the origin of coordinates of the x O z system. The value of such moving must experimentally be deduced for each profile of the disc. Generally, the swiveling angle α of the

armour 1 in relation to the course of flying should not exceed 10° for small ratio of the semi-axis **a** : **b**, and it should not exceed 5° for great ratio **a** : **b**.

Swivelling the armour 1 of the disc flying object around x-axis in the flying course for a smaller angle β in relation to the y-axis, the buoyancy centre of the point of application of the force F moves to the side of lifting and it changes the angle effect whose component in direction of y-axis reacts to the disc in a way that it turns in great curve to the opposite direction. The turning coefficient c should also be experimentally deduced as the function of swivelling angle β to y–axis and the flying velocity of the disc.

Meaning, the flying altitude is changing by changing the swivelling angle α to x-axis and the course of flying (turning in great curve at the same altitude) is changed by changing of the swivelling angle β in relation to y-axis. Combining the changes of the angles, basic manoeuvre abilities of the disc flying object (up-left, left-right) are achieved. Naturally, these forces do not exist in cosmic space, so that the manoeuvring must be performed using the appropriate group of rocket engines in order to reach the wanted point of destination.

The swivelling of the armour 1 in relation to the body 2 of the disc (towards x and y-axis) is achieved using hydraulic cylinders 17, flexibly connecting the armature and the body of the disc. The number and the powers of the cylinders are determined by the size of the object and by the forces of movement resistance and ascent, and there are at least four pairs of the cylinders. Also, the centers of coordinate systems of the airframe (x`, y`, z `) and the body of the disc coincide in every position. At addendum spots of the disc, i.e. in the centre of the circle viewed from the direction of z-axis, the armour and the body are connected with slide connections **7** in the shape of slide valve for example, through balls or elastic joints. With it the transfer of force F to the object as a whole is thus achieved.

For abutment of the disc flying object on solid surface in the static state of it is necessary that it has a specific number of support (trestles) 6 that must be withdrawn into the disc during flying. The minimum number of supports is three, but generally it is four. The number could be bigger at very large objects.

The supports 6 (trestles) include telescopically bound hydraulic cylinders drawn out under pressure, and drawn in with under pressure of hydraulic liquid. The length and number of singular cylinders in the telescope depends on the altitude at which the horizontal axis of the disc should be, or on the altitude between the lowest point of the disc and supporting surface. The diameter of the cylinders depends on the working pressure of hydraulic system and on the weight of the object. After the taking-off, in a phase of the disc acceleration, smaller cylinders are withdrawn into bigger ones and at the end they swivel and enter into the inside of the object. On the first, the biggest cylinder is the hatch closing the opening of the outer covering when the cylinder is drawn inside the object: it is shaped as the covering of that part. For swivelling of the support from inside of the object to the support position and back auxiliary hydraulic cylinders are used.

Supports 6, trestles can have jointly bound foots or wheels. If wheels are used, one or one pair of supports should be able to revolve about its axis so that the moving direction could be changed when the object moves on flat and solid surface. If a platform is used for taking-off and landing, which can be static or mobile (automotive or drawn), then jointly bound foots can be applied. The mentioned can also be used during landing on some other heavenly body or on a cosmic station.

In case of landing on completely rough surface the pressure in certain cylinders can be redistributed using appropriate sensors and regulators, so that the cylinders have different drawing heights keeping the disc in horizontal position.

For flying of the disc flying object in space, both atmospheric and cosmic, one of the most important conditions is the disc's stabilization. In the course of flying different forces continually react on the disc, which would, if there were no stabilization process, practically tumble the disc throughout the space. Such flight would be impossible.

Observing the disc from directions of x and y-axis, the profile is an ellipse and from the direction of z-axis it is a circle. That is why the object stabilization during flying must be performed using a special interior stabilizer.

Stabilizer 14 is placed beneath the floor and it is bound with tight connections 15 to it. The height of these connections depends on the engine diameter (turbojet or rocket) bound to the floor at the lower side..

The stabilizer is a ring whose cross section is a square or rectangle, as shown on cut in picture 8. The diameter of the ring-stabilizer is generally 0,6 – 0,8 of the disc radius. The cross section size depends on the size of the object and the extent of forces that act on it as well as on the type of drive and the abutment of the rotating rings.

The stabilizer 14 actually consists of the stator tightly bound with the connections 15 to the floor from the lower side, and two rotating rings. The stator has the form I of the profile including the vertical 20, the upper arm 21 and the lower arm 22. Between the arms there are rotating rings, the outer 23 and the inner 24.

The rotations of the outer 23 and the inner ring 24 are of opposite-direction and the rotations can be accomplished in several ways - mechanically, using fluid and with inverse magnetic field. The mechanical drive including cogwheels and friction wheels can only be used in the smallest and the trenage objects. Using fluids under pressure, the fluid is supplied through the appropriate nozzles 25 bound to the vertical part of the stator 20 and it activates the rotating rings having blades that present the working circuits of a turbine. The angle velocity of ring rotation depends on the pressure and the supplied fluid in a time unit. Using air for the rotation of the rings is possible only for objects flying in air space of Earth.

For rotation of the stabilizer rings it is the most suitable to use inverse magnetic field for all sorts of objects and flying conditions. For obtaining the inverse magnetic field the polyphase, alternating

current is run through the threads. The inverse magnetic field the currents create makes the rings that are then short – circuited rotors of electric motor, rotate.

The rotating rings are leaning on the stator arms, and thus on the floor and on the whole object with supports 26 that can be mechanical (balls or cones) through fluid cushions created with appropriate nozzles on stator arms, or through very powerful magnetic fields obtained by appropriate electromagnets. Using of air cuss ions is possible only for flying in air space. The mechanical support can only be used with small objects but its existence is necessary for all other ways of supports when the rings are static.

The rotating rings, outer 23 and inner 24 have a common rotation axis and revolve one towards the other in opposite directions. With the rings rotation the gyroscopic effect is accomplished so that the stabilizer is, in this case, a mega gyroscope. With rings-rotation having a specific moment of inertia, using the corresponding velocity angle, the gyroscope realizes a self kinetic moment that balances the moments of some external forces and with the rotation of the outer ring in opposite direction, the moments of other external forces are balanced. Thus the precession and notation are reduced to zero or the insignificant value.

The gyroscope must fulfill the following condition for one rotating ring:

$$(\mathbf{I_o} * \omega)^2 \geq 4 * \mathbf{I_c} * \mathbf{G} * \mathbf{e}$$

Where: $\mathbf{I_o}$ [kgm^2] is the ring inertia moment

ω [1 / s] is the angle velocity of the ring rotation

$\mathbf{I_c}$ [kgm^2] is the inertia moment of the center of gravity of the object

e [m] is the distance between the center of gravity of the ring and the center of gravity of the object

G [N] is the weight of the object

The opposite direction rotation besides balancing of moments of external forces, also provides the absence of the rotation of the object around the vertical axis in opposite direction of only one ring rotation. Also, the rotation velocity is adjusted depending on flying conditions. For example, during flying of the object through atmosphere and on closed trajectories around a planet (satellite) the self kinetic moment of the gyroscope must not be too big because the gyroscope axis and thus the object axis would keep the direction towards a constant spot in space. In that case, there is no coincidence of the object axis and direction of gravity force of the heavenly body around which the disc is flying, which is a condition for " horizontal " flight (the lower side of the object is constantly turned towards the heavenly body). However, in interplanetary flight, this is not a problem but a necessity. The ring rotation velocity also needs to be decreased during detour of the object to the left or right side in horizontal plane, so that the object " leans " and compensates the effect of centrifugal force in the curve. It is not necessary while side engines for lateral moving of the object are working. Also, the decrease of angle velocity of ring –rotation is necessary in the

course of changing of flying angle in vertical plane, for example, for oblique flight on taking-off or landing to get to the horizontal flight.

The disc flying object is drived with four engine groups for different flying conditions: for vertical flying and hovering 13, for flying forwards 16, for braking and flying backwards 3 and for lateral flying 9 and 29.

Each engine group includes the appropriate turbojet or rocket engines or their combination. The type of engines used depends upon application of the disc flying object. For flying in air space with velocities of 2 – 2,5 M (Mach) turbojet engines are used. For greater velocities up to 5 M and greater flying altitudes, rocket engines are added to these engines. For flying on closed trajectories around Earth (satellite), the combination of turbojet (for vertical and lateral flying) and rocket engines for flying forwards and braking are used. For flying on open trajectories in space, turbojet (or plasma reactive) engines are exclusively used.

The turbojet engines can be classical, turbofan or with additional combustion. The rocket engines, when classical, generally use liquid fuel, or they can be plasma reactive engines. The plasma reactive engines do not exist nowadays but they will exist in recent future. They will be applied for all kinds of flights, especially for interplanetary or interstellar but that will be the subject of a specific patent.

All engines are placed just below the floor and are bound to it, as shown at cut in picture 1 (the review is given regarding rocket engines). The air supply for combustion in turbojet engines is obtained through channels set at the flanges of the disc from inside to the opposite side from engine position. In classical rocket engines oxygen for combustion is stored in tanks and place for luggage and the tanks can be refilled. Different problems occur with use of plasma reactive engines, which will also be the subject of the other, singular patent.

The position of engine group 13 for vertical flight is at the flanges of the disc circle. The distance between the engines at the flanges is equal. The number and the power of these engines depends on the size and application of the object, but concerning the number, there should be at least six engines. During the performance, buoyancy force of half of the engines should be such to keep the object in a hovering position. These engines are used for vertical ascend, landing and hovering of the object in space. They are also used for rapid increase in flying altitude when required and in case the increase of the armour swiveling angle cannot provide it. For flight in the gravity field of a heavenly body, all of the engines from the group have the buoyancy direction opposite from the gravity force direction. In open trajectories of the flight, this group of engines must have both effects, so that the course of flying could be changed to " vertical ".

The engine group 16 for the drive of the disc flying object is set at the flanges of the disc opposite the moving direction and has that kind of buoyancy. The number and the power of the group depend on the size, application and the speed of the object. Generally, there are three, one central and two engines at side. In this manner, it is possible to use, if necessary, only one, only two or all three engines. Also, there

can be more than three engines. For flying through air space and for 2 – 2,5 M (Mach) velocities, turbojet engines used; and for velocities up to 5 M and greater flying altitudes, rocket engines 28 are added. Also, for turning of the object in greater bend in horizontal plane, a performance of one engine at a side, besides the central one, can be used.

The engine group 3 for abrupt braking and flying forwards is set at the flanges of the front part of the disc. Generally, this group includes two engines symmetrically set in relation to the flying axis (x-axis), but the number can be bigger, for example, there could be three engines as the case is with the group for moving forwards of the objects of specific application. This group of engines is used for abrupt braking, stopping and moving backwards. In order to stop the object flying in a gravity field, the engines for vertical flying need to be activated so that it would not come to the rapid dive. Also, the engines of this and previous group when used separately and if set symmetrically provide turning of the object around vertical, z-axis. The type of engines in this group is the same as in the previous.

The engine group 9 and 29 for lateral moving of the object are set at the flanges of disc vertical to the moving direction, to x-axis, i.e. in the y-axis direction, the 9 on the left side and the 29 on the right side. Generally there are two engines on each side of the disc. The power, i.e. the buoyancy of the engines is the smallest from the same of other engine groups. These engines are used for abrupt moving of the object from one side to the other away from x-axis, i.e. in the direction of y-axis, when disc is in moving or hovering position. They can also be used for abrupt detour in the course of flying, for example, to the left if the right 29 engines are on, or to the right if the left 9 engines works. The type of engines in this group is the same as in the previous ones.

For flying through atmosphere at great velocities and to great distances, a greater quantity of fuel is required for transporting a greater number of passengers and of heavier load. That is why a larger portion of the disc flying object is consumed by the fuel tanks. It is suggested that there should be two tanks: one up, above the passenger area and one beneath the stabilizer. The upper is set in the cut of the ellipse above the area, the ceiling and it is for the crew and the passengers 10. The lower is in the shape of the ring of diverse cross sections 5 and it is bound below the stabilizer 15. The ring shape is suggested because of decrease of inertia forces effects and because of the compactness of the central space for the auxiliary equipment and cargo, as well as for easier manipulation with it.

Beneath the floor 11, at the front part of the disc in the course of flying is the cabin 4 for flying staff (cockpit at airplanes). The remaining space above the floor is for passengers and their hand-baggage. However, for special flying objects, instead of the passenger's area, in this area, for example, scientific equipment, etc. can be installed. The central part of the area by vertical at flying objects with plasma reactive engines drives will be occupied with the devices of the plasma reactive generator that will also be the subject of a specific patent.

Beneath the floor 11, the space 12 inside the gyroscope rings 15 and the lower fuel tank 5 and below them is intended for storing of the auxiliary equipment 8 and for useful load.

These are only the suggestions for usual division of the space inside the flying object. However, depending on the size and application of the object, the space can be divided differently.

Hydraulic set of machines and proper installation is necessary for drawing in and out of the undercarriage 6, for swiveling of the disc armour for a specific angle in relation to the flying course using hydraulic cylinders 17, for opening and closing of the air hatches at the entrances of the turbojet engines, for opening and closing of the doors on the object and other commands.

The compressor and the proper installation is necessary for keeping the pressure in the aircraft during flying at great altitudes in air space, for cooling of the engine, for cooling of the outer covering with circulation between it and the inner covering at great flying velocities; it can also be applied for opening and closing of the doors in the state of inaction and for other commands.

For starting the engine and with it of the disc flying object, electric energy is required. For smaller objects accumulator battery is sufficient for starting the engine, and then the engines provide the adequate quantity of electric energy for performance of other consumers, for example, the gyroscope, the hydraulic set of machines, the compressor, the lighting, the controls, etc. With most of the aircrafts, accumulators are used for starting the set of machines for electric energy production, and when the engines take over the production, the accumulator remains as the reserve. At cosmic flying, when rocket engines are used, the sources of electric energy can be different, for example: solar cells, combustible cells, nuclear batteries or reactors, and also in the recent future, plasma generators.

Number and type of measuring instruments, regulatory and controls equipment depends primarily on the application of the aircraft and the equipment installed in it. Some of it are common, such as; altitude meter, speed indicator, indicator of the object position regarding all three axis, the stabilizer parameters, the parameters of the running motor for moving, the parameters of the auxiliary devices, the pressure at hydraulic and pneumatic installation, the pressure in the object, etc. Each of the objects must have devices for audio and visual contact with the base and other participants in the transportation, cameras, etc. Naturally, the flight of the object such as this is inconceivable without proper computers.

The control of the disc flying object, as the new type of aircrafts in atmosphere and space is not complicated because it includes the most of the components which operating is well known.

For taking-off, it is necessary to activate the stabilizer 15 before activating the engine group 13 for vertical flight. When the altitude of few hundred meters is reached, the disc detours in the flying direction and course using lateral engine groups 9 and 29. Then, using the hydraulic cylinders 17, the armour is swiveled towards the body 2 in the greatest angle α foreseen for the aircraft and the engine group 16 for flying forwards is activated. The aircraft increases the altitude and the velocity at oblique flight. With the increase of flying velocity the angle α between the armour 1 and the body 2 decreases as well as the buoyancy of the engine group 13 for vertical flying. Reaching the altitude and the speed foreseen for that aircraft, it transits to horizontal flight, without engine group 13 for vertical flying. The altitude change during flying is obtained by changing the angle α between the armour 1 and the body 2,

or by occasional slight activating of proper engines from the group 13 for vertical flight. In the course of the flight it is possible to change course by swiveling the armour 1 around the transverse axis from the flying course, i.e. around x-axis for an angle β regarding the y-axis; or lateral engine groups 9 and 29 are used. It is able, using these groups of engines, to move laterally and thus avoid eventual clashes. For the landing the process is reversed.

If used for flying through space, the disc flying object uses so far rocket engines instead of the turbojet, and it is constructively adjusted for the conditions. It rises vertically only few hundred meters and then it constantly mounts to the orbit altitude for 45° to 75°. When it finals the predicted mission lasting from several days to several years, the disc flying object returns to Earth using the reversed procedure. After the overhauling, the aircraft is ready for flying into space again. The great volume of the aircraft enables taking into cosmos a great number of people, scientific equipment and food, drink and oxygen provisions, as well as the fuel for departure and return.

The similar procedure is for the open flight, i.e. interplanetary, till 2nd cosmic speed is achieved and until the object emerges from the earth orbit. After that the aircraft moves at inertia, occasionally specific rocket engines are activated for the correction of the trajectory. When the mission on some planet is completed, the object, using the same procedure as in taking-off from the Earth, flies off from the planet and continues the return. Multiple usages are possible concerning these aircrafts, i.e. after the overhaul it can be used for new missions.

INDUSTRIAL OR OTHER APPLICATION METHODS OF THE INVENTION

It is clear from the description that the application of this invention, the disc flying object in air and cosmic transition has broad application possibilities.

The disc flying object is constructed for each concrete application. Concerning the size, it can be small, medium and great; it can be civil, military, passenger aircraft or for cargo; for flying through atmosphere, space or the combination of the two and other applications. It is primarily intended for drives with the plasma reactive engines, but until their production begins, the existing engines can be used for air and space aircrafts. Also, for projecting and constructing these objects, a special knowledge is not required, but the one used for projecting air and space aircrafts, i.e. the knowledge in mechanical engineering, electrotechnic, aerial and cosmonautics.

It is to be expected because of the advantages that the disc flying object together with the similar ones of this area becomes the basic mean of transportation in space in 21st century.

For production of this invention, the existing equipment is sufficient, the one used for production of air and cosmic aircrafts.

Disregarding the great complexity of the disc flying object, the projection and construction of it does not require a special knowledge but the one used for projecting air and space aircrafts, i.e. the knowledge in technical, mechanical engineering and electrotechnic, as well as in air and cosmonautics.

For closer view on the possibilities of the disc flying object, a basic calculation parameters are given for one of the object:

- disc diameter	12m	-number of crew members	10
-minor ellipse semi-axis	3m	-number of passengers	110
-circle surface	113m^2	- useful load	140kN
-ellipse surface	56,5m^2	- number of engines for vert. flight	12
-object volume	452m^3	- number of mpt -for horiz. flight	3
-empty object weight	420kN	- engine buoyancy	90kN
-fuel weight	340kN	- flying altitude up to	15.000m
-max.velocity	1,8M	- flying range of about	10.000km

PATENT CLAIMS

1. **The disc flying object**, as a new form of aircraft for flying through atmospheric or cosmic space, is **characterized with** the following: it consists of the armour (1) and the body (2) having a disc form which observed from directions of x and y-axis has the form of an ellipse of greater semi-axis **a** and the minor semi-axis $\mathbf{b_1}$ and $\mathbf{b_2}$; and observed from direction of z-axis it has the form of a circle of the radius R, greater semi-axis **a** being equal to the radius R, so that they are mutually bound by hydraulic cylinders (17) and by the slide contacts (7), the body (2) being divided in the xOy plane by the floor (11) to the upper part (10) including command area, regulatory and measuring devices (4), and to the lower part (12) including the stabilizer (14) bound to the floor(11) with tight connections (15), fuel tank (5), auxiliary equipment (8) , undercarriage (6), drive engines bound to the floor (11) from the lower side, that can be turbojet, rocket or plasma reactive, forming the group of engines for vertical flying or hovering in gravity field (13), engine group for flying forwards (16), engine group for abrupt stopping and flying backwards (3), engine group for abrupt lateral moving in the course of flying or hovering (9 and 29).

2. **The disc flying object** according to the patent claim 1. and **the variant I** consisting of the armour and the body (18) bound together by hydraulic cylinders (17) and the sliding connection (7), so that the body (18) is divided by the floor (11) to the upper part (10) including command area (4) and to the lower part (12) in which there is the stabilizer (14) bound with tight connections (15) to the floor (11), fuel tank (5), auxiliary equipment (8), undercarriage (6), drive engine group for vertical flying and hovering (13), engine group for flying forwards (16) , engine group for abrupt stopping and flying backwards (3), engine group for abrupt lateral moving in the course of flying or hovering (9 and 29); **is characterized with** the armour and the body (18) constructed from two semi-discs joint with an elliptic cylinder in direction of x-axis.

3. **The disc flying** object according to the patent claim 1. and **the variant II** consisting of the armour and body (19) bound together by hydraulic cylinders (17) and slide connection (7), so that the body (19) is divided by the floor (11) to the upper part (10) in which there is the command area (4) and to the lower part (12) in which there is the stabilizer (14) bound with tight connections (15) to the floor (11), fuel tank (5), auxiliary equipment (8), undercarriage (6), drive engine group for vertical flight and hovering (13), engine group for flying forwards (16) , engine group for abrupt stopping and flying backwards (3), engine group for abrupt lateral moving in the course of flying or hovering (9 and 29); **is characterized with** the armour and the body(19) consisting of the three discs linked

together with halves of an elliptic cylinders so that together they compose an equilateral triangle with rounded angles.

4. **The disc-flying object** according to the patent claim 1., **is characterized with** the stabilizer (15) in form of circular annulus of the quadrangular cross section and it includes the stator of the form of profile I, having the vertical (20) and horizontal arms, the upper (21) and the lower (22) between which rotate the outer (23) and the inner ring (24) in opposite directions in the gaps (27) as the following elements (25), while drive elements (mechanical, fluid or electromagnetic) (25) are set on the vertical (20) and the rotating rings are kept in hovering position by the cushions (26) (mechanical, fluid or electromagnetic) .

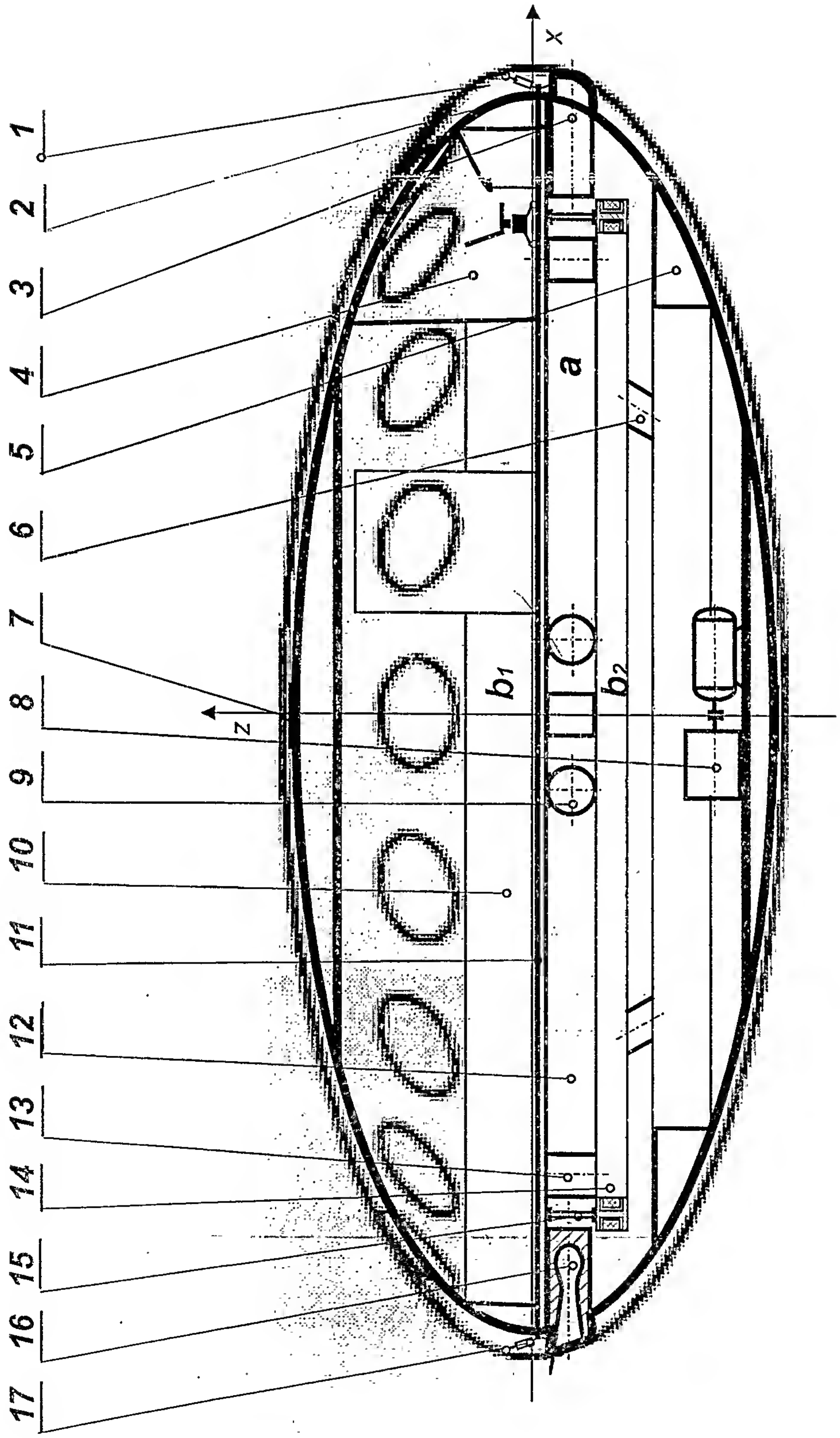


Fig.1

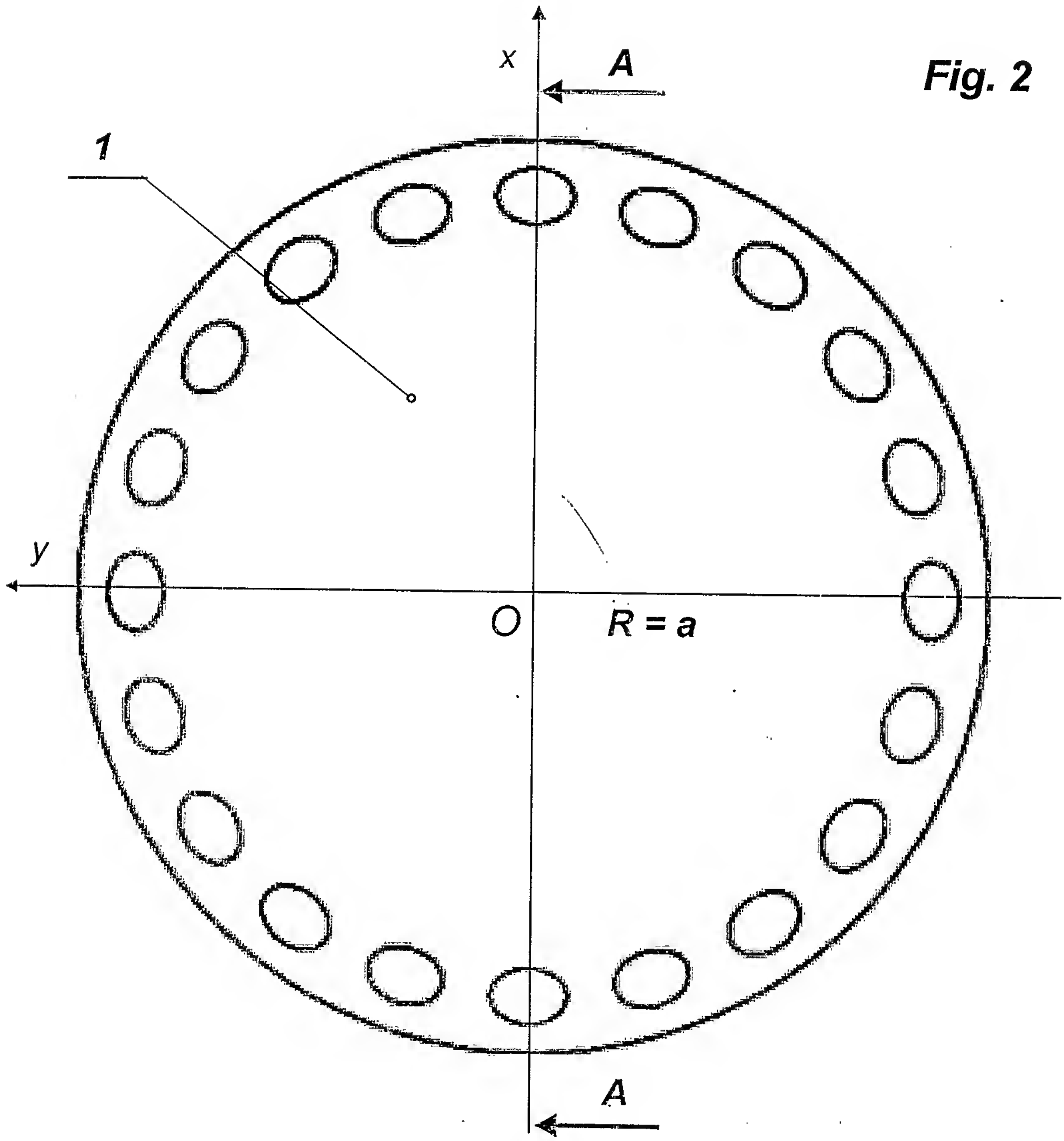


Fig. 2

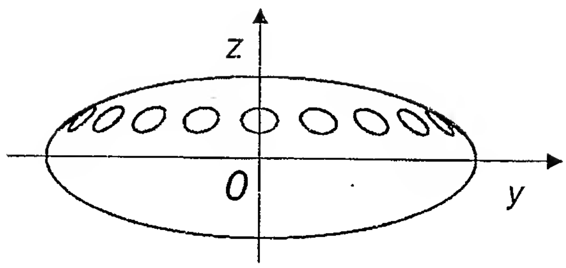


Fig. 3

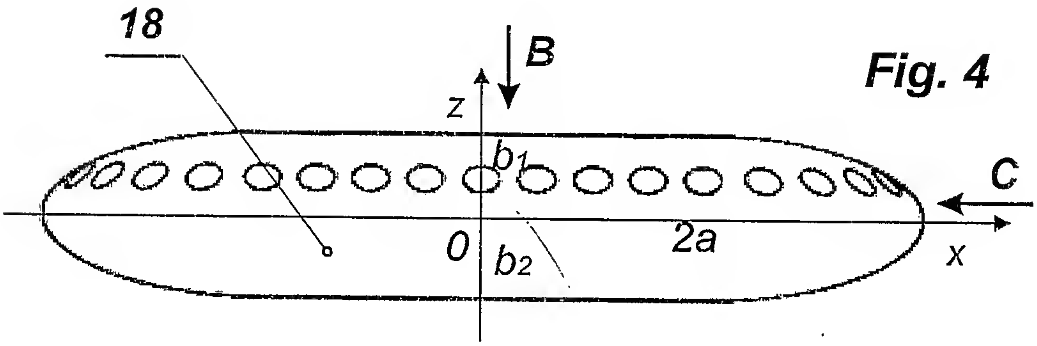


Fig. 4

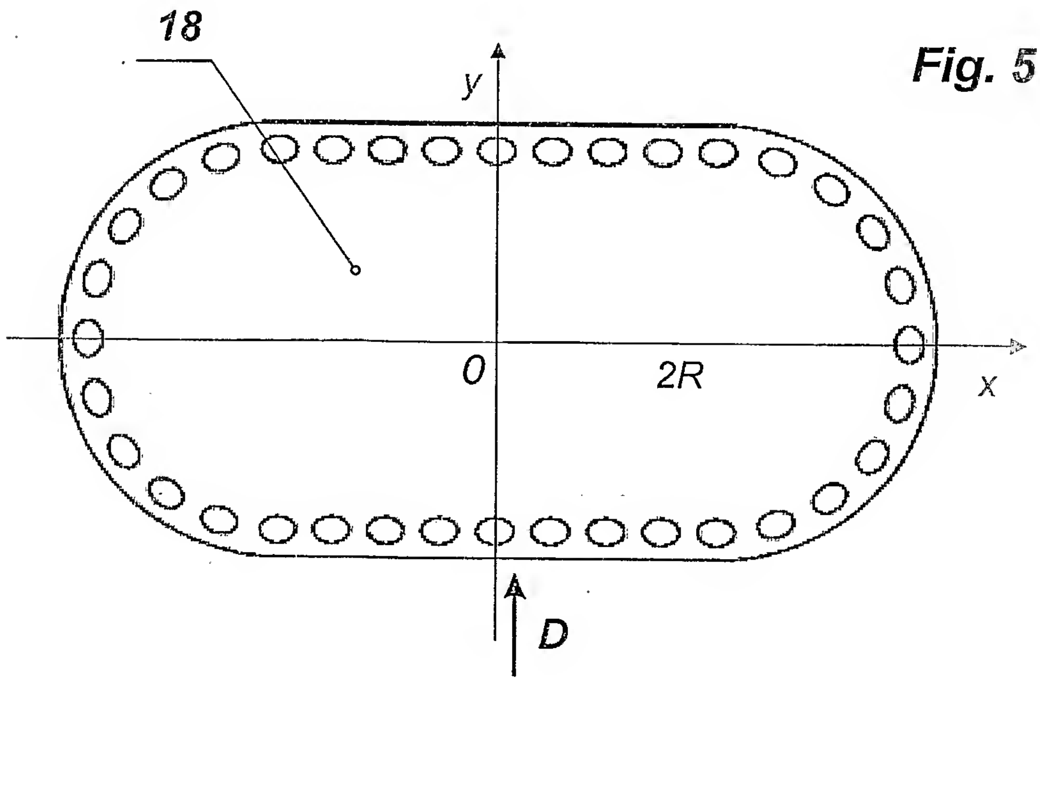


Fig. 5

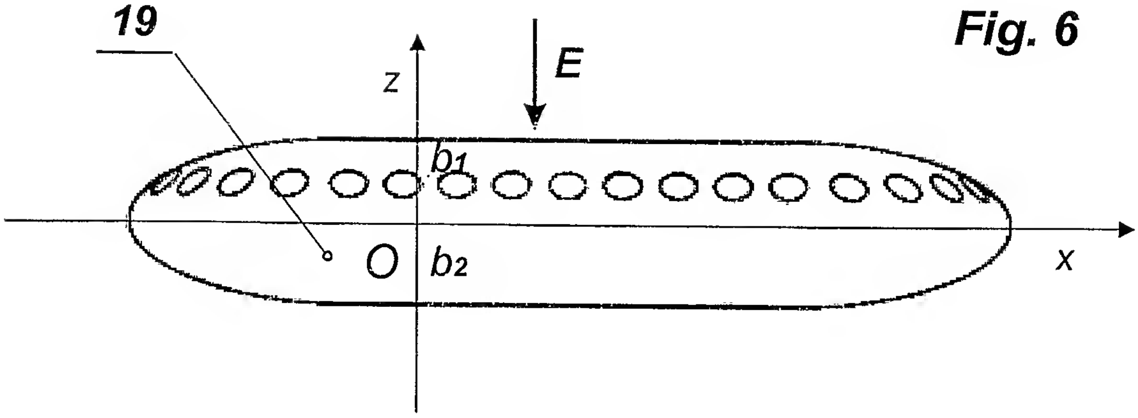


Fig. 6

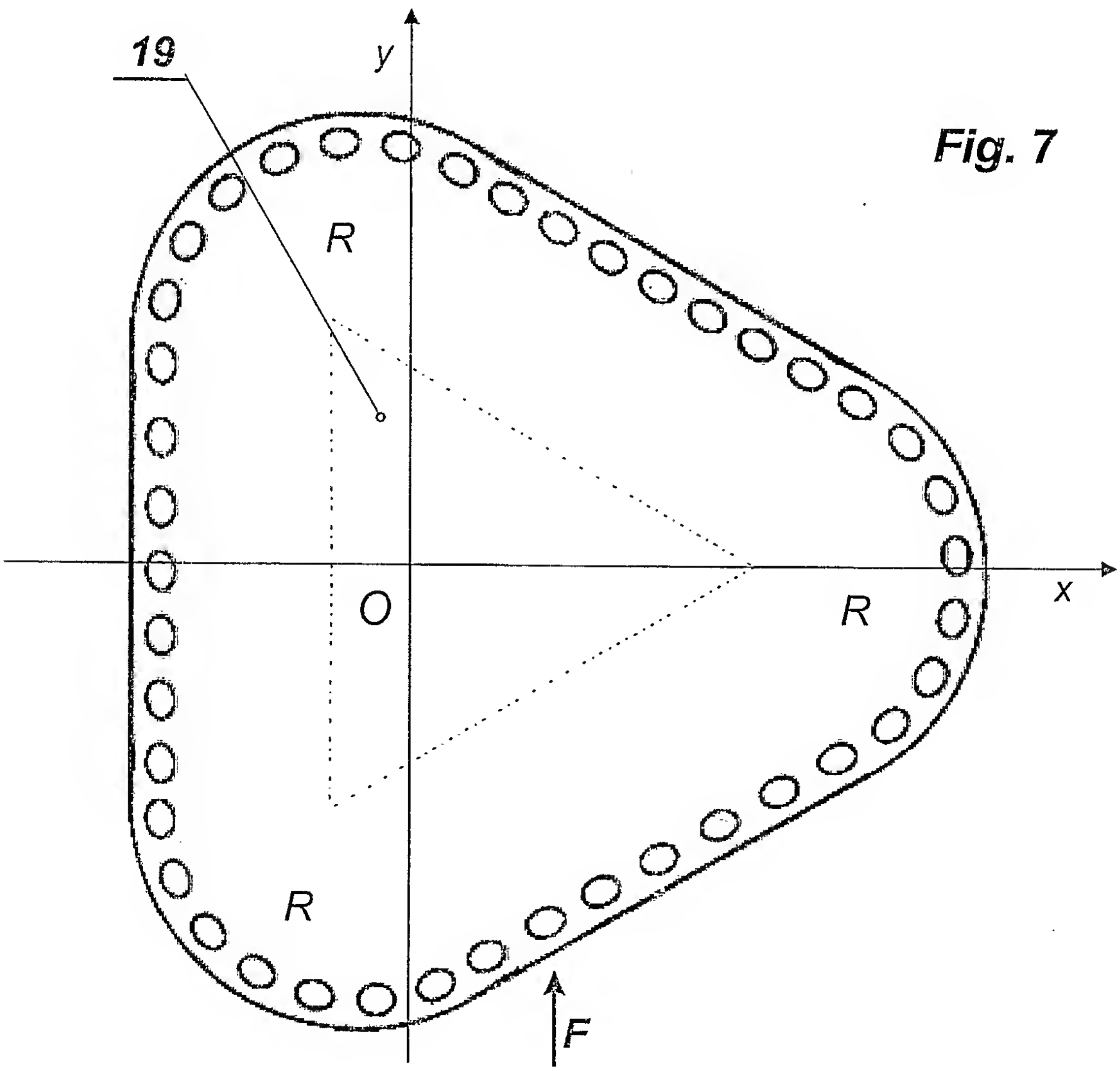


Fig. 7

Fig. 8

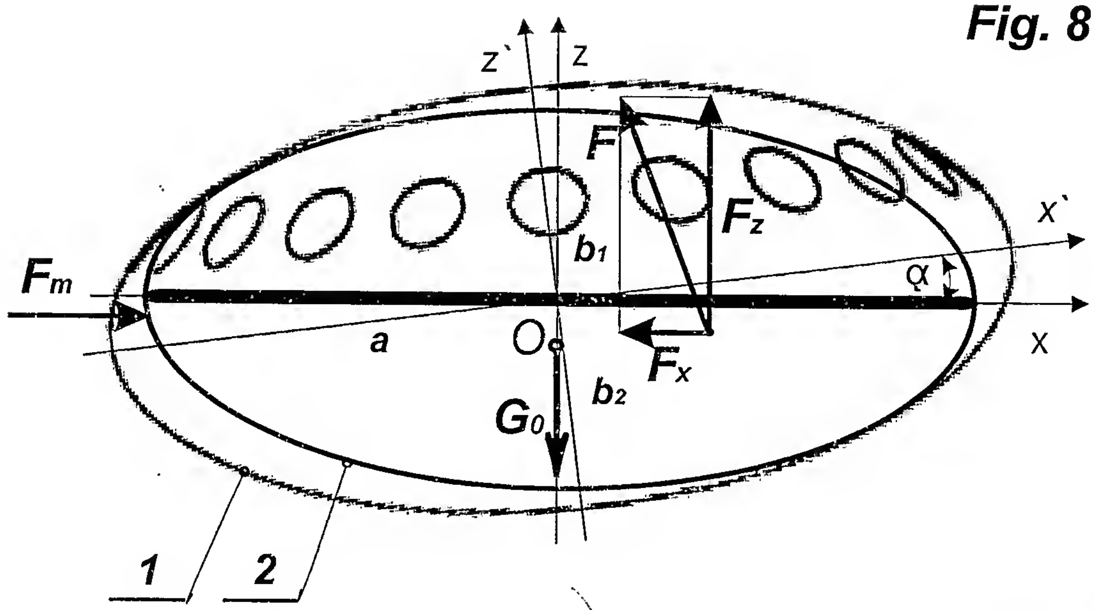
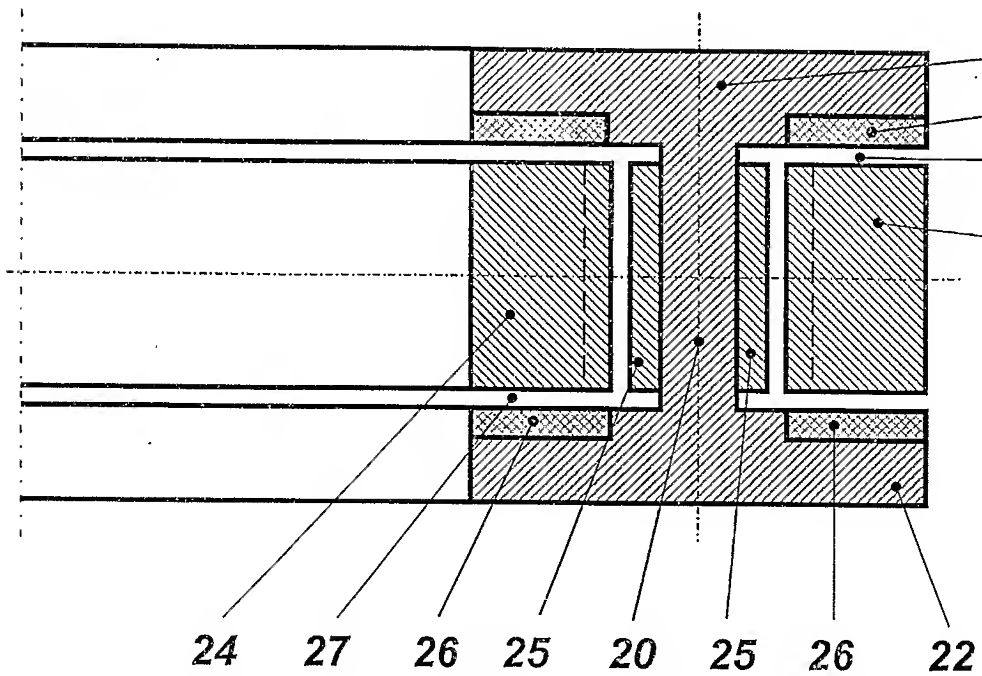


Fig. 9



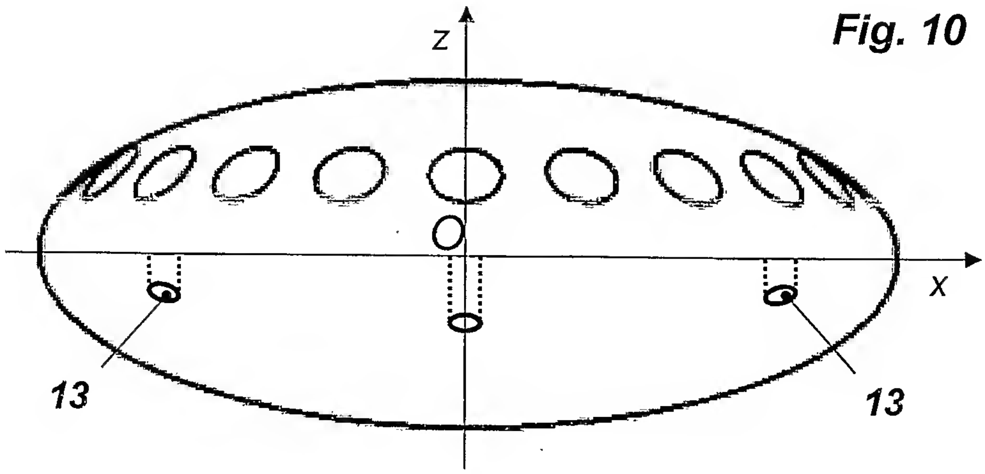


Fig. 10

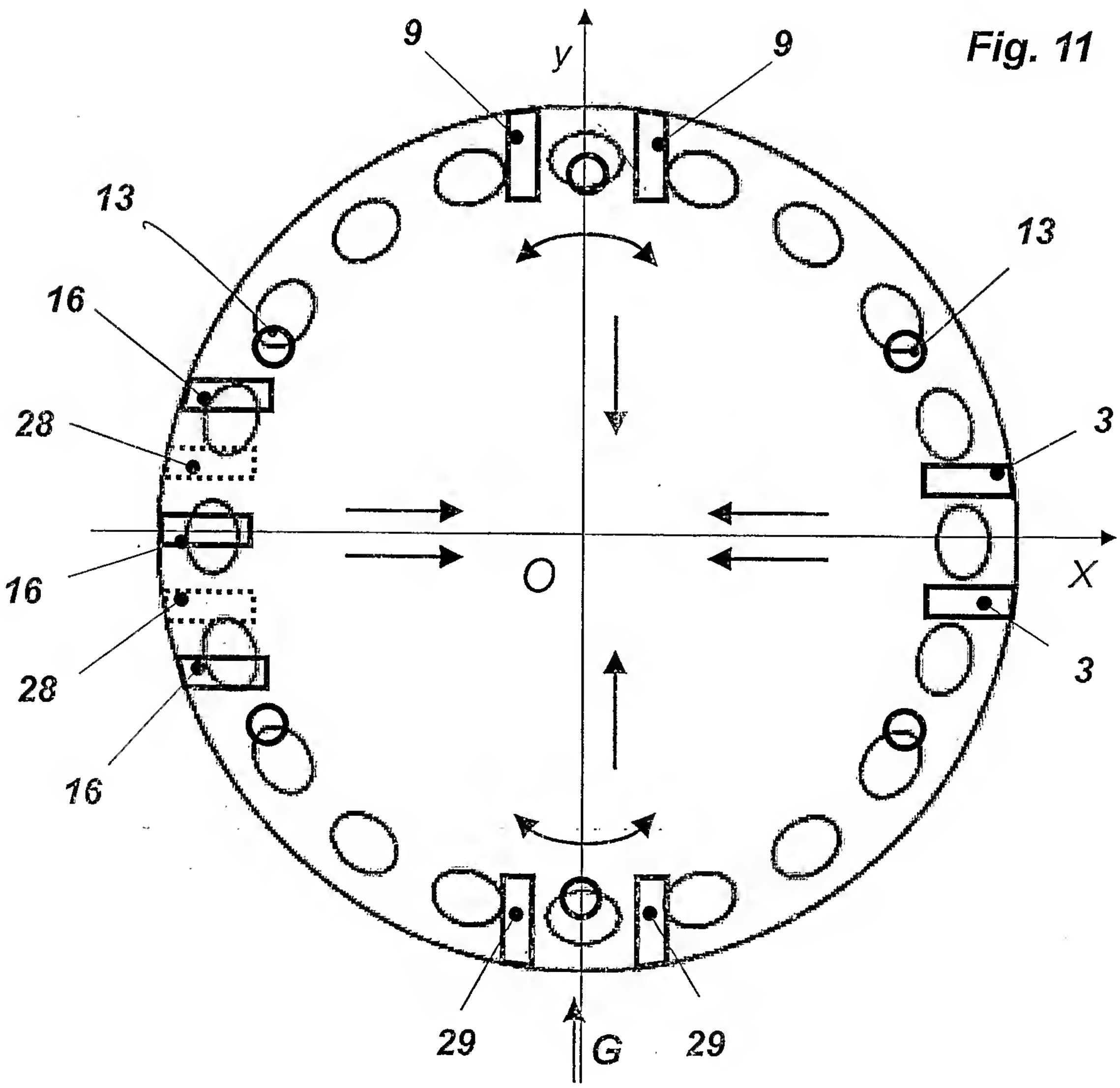


Fig. 11

INTERNATIONAL SEARCH REPORT

International Application No
PCT/YU 03/00025

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B64C39/00 B64G1/40

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B64C B64G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 730 390 A (PLICHTA PETER ET AL) 24 March 1998 (1998-03-24) the whole document ---	1-4
A	DE 198 18 945 A (ROTHKUGEL KLAUS PETER) 4 November 1999 (1999-11-04) the whole document ---	1-4
A	DE 196 30 026 A (REDEL GEORG) 29 January 1998 (1998-01-29) the whole document ---	1-4
A	US 5 259 571 A (BLAZQUEZ JOSE M R) 9 November 1993 (1993-11-09) the whole document ---	1-4
	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 March 2004	18/03/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Estrela y Calpe, J

INTERNATIONAL SEARCH REPORT

International Application No
PCT/YU 03/00025

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 351 911 A (NEUMAYR GEORGE A) 4 October 1994 (1994-10-04) the whole document	1-4
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
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